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Philometra mariae LAYMAN, 1930 from a Right-eyed Flounder, *Limanda yokohamae*

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A large number of encapsuled, philometrid nematodes were obtained from the fin and operculum of a right-eyed flounder, *Limanda yokohamae*, which was collected in Otsuchi Bay, Iwate Prefecture, in August, 1966. The present specimens closely resemble *Philometra mariae* LAYMAN; this species was detected from the fin of *Protopsetta herzensteini* and *Limanda schrenki* and the ovary of *Sebastodes schlegelii* in Peter the Great Bay. LAYMAN's description and figures are not detailed, and the present specimens are generally larger than LAYMAN's ones (Table 1). In philometrid nematodes, however, the size of the same species varies so much that the size is of little classificatory importance. The two worms were collected from the fin of the same pleuronectid fishes in the neighboring seas. Consequently, the present specimens are considered to belong to *Philometra mariae*. On the other hand, this species also resembles *Clavinema parasiluri* YAMAGUTI, 1935, which was obtained from the operculum and submaxilla of the catfish; *Parasilurus asolus*, in Lake Ogura, Kyoto. RASHEED (1963) revised the genus *Philometra* and asserted the invalidity of the genus *Clavinema*; main reason was the immaturing of *C. parasiluri*. Classificatory discussion is postponed to another occasion, however, it is conceived that the genus *Clavinema* is valid and *Philometra mariae* is transferred to the genus *Clavinema*.

(Received Aug. 29, 1970)

There have in the past been several reports on the following Philometridae nematodes family parasitizing fish viz. Philometra carassii parasitizing the caudal fin of crucian carp (ISHII, 1934), Philometroides cyprini parasitizing the under skin of carp (ISHII, 1931) and Philometroides seriolae parasitizing the dark muscle of yellowtail (ISHII, 1931). We will report here on an unusual natural case we found in which numerous nematodes of the Philometridae family were parasitizing a right-eyed flounder. We will add some comments on the taxonomy question of these nematodes.

Materials

Adherence of numerous cysts containing nematodes was observed on a right-eyed flounder Limanda yokohamae (GÜNTHER) 16 cm in length hooked inside the Otsuchi Bay, Kami-hei township, Iwate Prefecture in August 1966. These cysts were spherical-oblong, 2-13.5 x 2-10.2 mm in size. There were about 20 cysts in continuity on the dorsal fin of the eyeless side of the fish and 21 in similar continuity on the anal fin. There were 6 cysts more or less clustered on the outside of the gill opercula and 8 on the inside. The total was 55 cysts. One or two entwined nematodes were detected in each of the cysts. After being landed, the flounder was immediately fixed in formalin. It was therefore difficult to extract the nematodes integrally out of the cysts. Some of the nematodes we used were broken. We rendered the specimens transparent with Getah fluid to be used for microscopic observations.

Observation of the nematodes

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All the detected individuals were female. We noted no males. The body is cylindrical with the head and tail ends being blunt-roundish. The head or tail parts have no nipple. The body is 31.5-41.7 mm long and 1.55-2.00 mm wide. The mouth opens in a triangular fashion and adjoins immediately the oesophagus which consists of two parts, one bulbous and another one oblong-cylindrical contiguous to the former. The bulbous part is large, viz. 0.314-0.435 x 0.354-0.436 mm. The upper end forms a trilabial outgrowth and is located right behind the mouth. A three-forked cavity follows the center of the bulbous part. The cylindrical part is 1.08-1.35 mm long,

0.111-0.139 mm wide and the neural ring is located about 0.435 mm from the head end. The center of the cylindrical part is swollen and there is a fusiform oesophagus gland having one large nucleus. The intestines are fairly wide (the original part is 0.86-1.27 mm wide) and narrows as it reaches the lower part of the body. It ends in a blind canal about 0.35 mm from the caudal end. At the extremity of the intestine there is an accessory filiform process. There is no anus. The uterus is a blind capsule so big that it fills almost entirely the body cavity. It is full of eggs and of young individuals. At the upper and lower ends of the uterus, one sees separate curling string-shaped ovaries having a length of 1.17-1.23 mm and a maximum width of 0.101-0.192 mm. The young individuals inside the uterus are 0.388-0.440 x 0.0189-0.0208 mm in size and there is an anus at about 0.085 mm from their caudal end.

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Problems of taxonomy

In a survey of fish parasites conducted in 1930 in the Peter the Great Bay in the northern Sea of Japan, LAYMAN of the USSR reported finding Philometra mariae in the connective tissues of the fins of magarei* and of kurogashiragarei** as well as in the ovary of kurosoi***. We give hereunder the translation of his original description.

Translator's notes:

*Species very close to makogarei (right-eyed flounder).

**Seems to be a name used in Hokkaido for makogarei (literally "black-headed flounder").

***Species close to kitsune mebaru (literally "fox-black rock fish") Sebastes vulpes Steindachner & Döderlein.

The parasite is 1.6-3.2 cm long and 0.73-0.81 mm wide. The mouth is surrounded by a peculiar buccal capsule. The length of the latter is 0.22 mm and its width 0.24 mm. The oesophagus is 0.73 mm long. The intestines open in a vestigial anus. The uterus develops to the front and to the back. The neural ring is quite visible and progresses toward the front part of the body. There is no reproductive opening. Viviparous. Since this parasite was discovered for the first time during a survey of the Pleuronectida order by Marie Borowkoff who participated in the 42nd investigation of helminths in the USSR, I called this species Philometra mariae n. sp. Only females are seen.

The description by LAYMAN is thus extremely succinct. The two sketches of the front and rear parts of the parasite are very rough. p. 23 We see no further report on this species by LAYMAN. What he records as mouth capsule (Mundkapsel) seems from the attached sketch to be the bulbous part of the oesophagus. If we compare with the parasites obtained this time from right-eyed flounder we see that the body length and width, size of the bulbous part of the oesophagus and length of the cylindrical part of the oesophagus are larger in our samples. LAYMAN says that the intestines open into a vestigial anus, and draws accordingly in the appended diagram. In our specimens, we see only a filiform accessory process that is attached to the end of the intestines and no anus. Regarding the morphology of the bulbous part of the oesophagus and of the oesophagus gland, and the size of the young individuals inside the uterus, LAYMAN gives no description at all so that no comparison is possible. If, however, we refer to the sketches by LAYMAN, we see that except for the somewhat general large size of our specimens, there is a close similarity. Among the

nematodes of the Philometridae family, there is a noticeable variety in size even within same species. This is why size is said to be less important than the other characteristics in the classification of these organisms (RASHEED, 1963). Considering that both parasites were detected from the fins of fish of the same Pleuronectidae family, we classified the present parasite obtained from right-eyed flounder as Philometra mariae for the time being and limited ourselves to fill in the unclear points of the original description.

In 1935 YAMAGUCHI reported having found Clavinema parasiluri of the Philometridae family in the connective tissues of the inner gill opercula and lower maxilla of a Far Eastern catfish in the Ogura lake near Kyoto. So far the Clavinema genus contains only one species viz. C. parasiluri. The characteristic of the genus is that the body is clavate, that the muscular tissues of the body wall are strongly developed, that there are no nipples at the head or caudal parts, the presence of a fusiform oesophagus gland at about the center of the oesophagus, and parasitism of freshwater fish. Except for the clavate form (length: 5-12 mm) and the parasitism of catfish which is a freshwater fish there is a very close resemblance to the Philometra mariae of LAYMAN. We see no eggs or young individuals developed in the uterus of the individual described by YAMAGUCHI. Since the specimen was not a mature individual, it is questionable whether the clavate form may be given (the name of the genus too originates from the form) as a characteristic of the genus.

Recently RASHEED (1963) reexamined the Philometra genus and the closely related genera. In his study he touched on the Clavinema genus and pointed out to the fact that C. parasiluri reported by YAMAGUCHI

was an immature individual and that the difference from Philometra parasiluri detected simultaneously by the same researcher from the eye socket of catfish in the Ogura lake rested on the presence or absence of head and caudal end nipples and on the size of the oesophagus gland, and he wondered whether the head part nipple of C. parasiluri had not just been lost. Be this what it may, the validity of the Clavinema genus is not accepted by RASHEED until an adult individual can be found. Meanwhile, there is no discussion at all about Philometra mariae.

We will report again on the above taxonomy problems but we think that the Clavinema genus is valid, and that Philometra mariae must probably be shifted to the Clavinema genus. At the present stage, however, we will for the time being classify the nematodes obtained in the present study as Philometra mariae LAYMAN 1930.

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Pathological characteristics

The harm caused by the Philometridae nematodes is not well known. Philometroides cyprini in carps causes the scales of the diseased part to come off and the commercial value of the fish drops. The fish may die because of secondary concurrent diseases (SHINOHARA, 1970). p. 24 In reared yellowtail, Philometroides seriolae is the cause of weakening, deformity, poor growth but there is also parasitism of healthy fish and no serious harm seems to appear (NAKAJIMA, EGUSA 1969). In the present examples in which numerous capsules containing parasites were attached to the fins and to the inside and outside of the gill opercula, one might suspect considerable mechanical obstruction with regard to movement, feeding and breathing. Parasitism by the Philometridae family is said to vary according to the seasons.

It is not clear whether in the case of the present flounders, all parasites leave the fish after the end of the summer.

I thank Mr. Tetsuro ITO of the zoological team of the Science Department of Tokyo University who donated the valuable materials, and Dr. Muneaki ABE of the Eastern Fisheries Research Center who identified the right-eyed flounder.

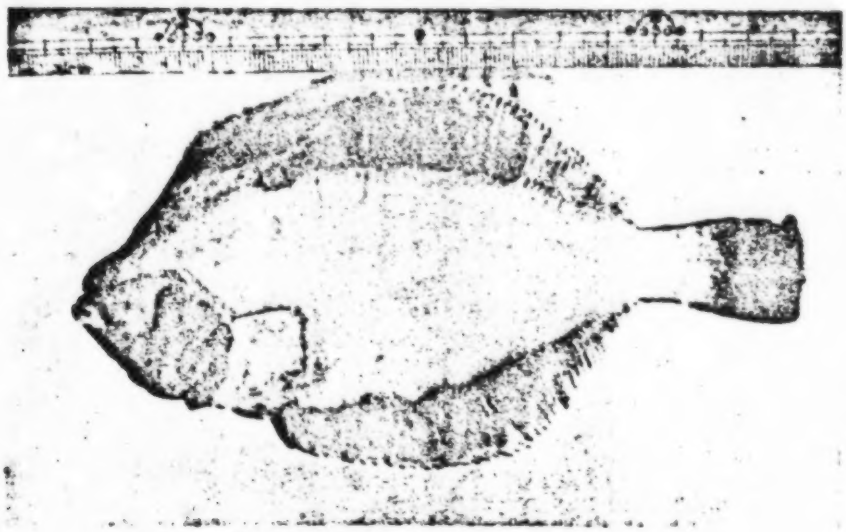
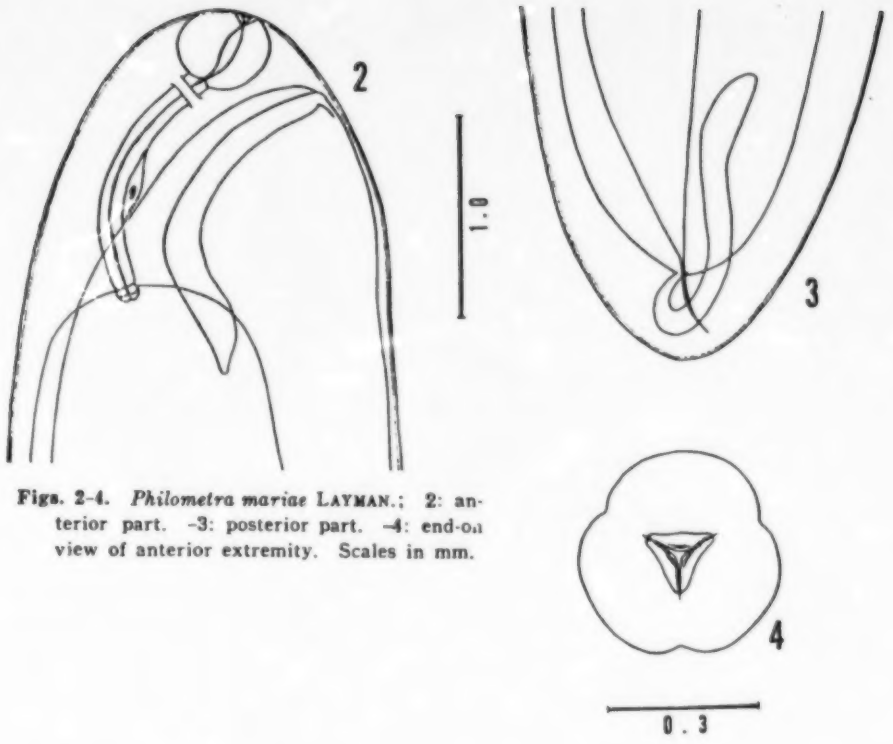


Fig. 1. Right-eyed flounder, *Limanda yokohamae*, with many *Philometra mariae* nematodes.



Figs. 2-4. *Philometra mariae* LAYMAN.; 2: anterior part. -3: posterior part. -4: end-on view of anterior extremity. Scales in mm.

Table 1. Dimensions of *Philometra mariae* (Female).

	LAYMAN (1930)	MACHIDA (1970)
Host and habitat	Fin of *Protopsetta herzensteini* and *Limanda schrenki*; Ovary of *Sebastodes schlegelii*	Fin and operculum of *Limanda yokohamae*
Locality	Peter the Great Bay	Otsuchi Bay
Body length	16~32 mm	31.5~41.7 mm
Body width	0.73~0.81	1.55~2.00
Anterior bulbous part of esophagus	0.22×0.24	0.314~0.453×0.354~0.436
Posterior cylindrical part of esophagus	0.73×—	1.08~1.35×0.111~0.139
Larvae	—	0.388~0.440×0.0189~0.0208

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